

WHAT IS CLAIMED IS:

1 1. A stent-graft device for treating an abdominal aortic aneurysm, the
2 stent-graft device comprising:
3 at least one stent member comprising at least one of a self-expanding stent
4 member and a balloon-expandable stent member; and
5 at least one tubular graft member coupled with the at least one stent member,
6 the tubular graft member having a proximal end and at least one distal end.

1 2. A stent-graft device as in claim 1, wherein at least one stent member
2 comprises:
3 at least one self-expanding stent member; and
4 at least one balloon-expandable stent member coupled with the at least one
5 self-expanding stent member.

1 3. A stent device as in claim 2, wherein the at least one self-expanding
2 member and the at least one balloon-expandable member comprise a plurality of alternating
3 members, every other alternating member comprising either a self-expanding material or a
4 balloon-expandable material.

1 4. A stent-graft device as in claim 3, wherein the balloon-expandable
2 material comprises stainless steel and the self-expanding material comprises nitinol.

1 5. A stent-graft device as in claim 3, wherein the alternating members are
2 coupled together with one or more pieces of adhesive.

1 6. A stent-graft device as in claim 5, wherein the adhesive further couples
2 the alternating members with the tubular graft member.

1 7. A stent-graft device as in claim 3, wherein the alternating members are
2 coupled together via one of welding, soldering or tying.

1 8. A stent-graft device as in claim 3, wherein the alternating members
2 comprise a plurality of diamond-shaped members coupled together to form a cylindrical
3 stent.

1 9. A stent-graft device as in claim 1, wherein the at least one tubular graft
2 member comprises:

3 a main graft member toward the proximal end of the tubular graft member;
4 and

5 at least one leg having a proximal end and a distal end, each leg member being
6 coupled with the main graft member at its proximal end and extending toward the distal end
7 of the tubular graft member.

1 10. A stent-graft device as in claim 9, wherein the at least one leg member
2 comprises two leg members for coupling the distal end of the tubular graft member with two
3 iliac arteries branching from the abdominal aorta.

1 11. A stent-graft device as in claim 10, wherein the two leg members
2 comprise two sinusoidal leg members.

1 12. A stent-graft device as in claim 11, wherein the two sinusoidal leg
2 members are helically intertwined.

1 13. A stent-graft device as in claim 10, wherein each of the two leg
2 members is coupled with an iliac stent member at its distal end.

1 14. A stent-graft device as in claim 17, wherein the iliac stent member
2 comprises at least one of a self-expanding stent member and a balloon-expandable stent
3 member.

1 15. A stent-graft device as in claim 10, wherein each of the two leg
2 members is removably couplable with the main graft member.

1 16. A stent-graft device as in claim 9, wherein the main graft member is
2 coupled with at least one stent member at the proximal end of the tubular graft member, and
3 each of the at least one leg members is coupled with at least one stent member at the distal
4 end of the tubular graft member.

1 17. A stent-graft device as in claim 9, further comprising a skirt graft
2 member coupled with at least one of the main graft member and the stent member near the
3 proximal end and extending toward the distal end.

1 18. A stent-graft device as in claim 1, further comprising a suprarenal
2 anchoring member coupled with the stent member for anchoring the stent-graft device at a
3 location superior to renal arteries branching from the abdominal aorta.

1 19. A stent-graft device as in claim 18, wherein the suprarenal anchoring
2 member comprises at least one of a self-expanding stent member and a balloon expandable
3 stent member.

1 20. A stent-graft device as in claim 18, wherein the suprarenal anchoring is
2 coupled with at least one of the self-expanding stent member and the balloon expandable
3 stent member by at least one connective member selected from the group consisting of wire,
4 ribbon, rods and bands of material.

1 21. A stent-graft device as in claim 18, further comprising an infrarenal
2 anchoring member coupled with at least one of the stent member and the suprarenal
3 anchoring member for further anchoring the stent-graft device at a location inferior to the
4 renal arteries.

1 22. A stent-graft device as in claim 21, wherein the infrarenal anchoring
2 member comprises at least one of a self-expanding stent member and a balloon expandable
3 stent member.

1 23. A stent-graft device as in claim 1, further comprising an infrarenal
2 anchoring member for anchoring the stent-graft device at a location inferior to renal arteries
3 branching from the abdominal aorta, the infrarenal anchoring member comprising at least one
4 of a self-expanding member and a balloon-expandable member.

1 24. A stent-graft device as in claim 1, further comprising at least one
2 expandable balloon member coupled with the at least one balloon-expandable stent member
3 for expanding the balloon-expandable stent member.

1 25. A stent-graft device as in claim 1, further comprising at least one skirt
2 graft member coupled with at least one of the stent member and the tubular graft member at
3 or near the proximal end of the tubular graft member and extending toward the distal end.

1 26. A stent device for treating an aneurysm, the stent-graft device
2 comprising:
3 at least one self-expanding stent member; and
4 at least one balloon-expandable stent member coupled with the self-expanding
5 stent member.

1 27. A stent device as in claim 26, wherein the at least one self-expanding
2 member and the at least one balloon-expandable member comprise a plurality of alternating
3 members, every other alternating member comprising either a self-expanding material or a
4 balloon-expandable material.

1 28. A stent-graft device as in claim 27, wherein the balloon-expandable
2 material comprises stainless steel and the self-expanding material comprises nitinol.

1 29. A stent device as in claim 27, wherein the alternating members are
2 coupled together with one or more pieces of adhesive.

1 30. A stent device as in claim 29, wherein stent device further comprises at
2 least one tubular graft member and the adhesive further couples the alternating members with
3 the tubular graft member.

1 31. A stent-graft device as in claim 27, wherein the alternating members
2 are coupled together via one of welding, soldering or tying.

1 32. A stent-graft device as in claim 27, wherein the alternating members
2 comprise a plurality of diamond-shaped members coupled together to form a cylindrical
3 stent.

1 33. A stent-graft device for treating an abdominal aortic aneurysm, the
2 stent-graft device comprising:
3 a proximal stent member for coupling the stent device with the abdominal
4 aorta proximal to the aneurysm;
5 at least one distal stent member for coupling the stent device with a blood
6 vessel distal to the aneurysm; and

7 at least one graft member coupled with and extending between the proximal
8 stent member and the at least one distal stent member, at least a portion of the graft member
9 having a sinusoidal shape.

1 34. A stent-graft device as in claim 33, wherein the at least one distal stent
2 member comprises two iliac stent members for coupling the stent-graft device with two iliac
3 arteries branching from the abdominal aorta.

1 35. A stent-graft device as in claim 34, wherein the at least one graft
2 member comprises:
3 a main graft member coupled with the proximal stent member; and
4 two leg members, each leg member coupled with the main graft member and
5 one of the two iliac stent members.

1 36. A stent-graft device as in claim 34, wherein the at least one graft
2 member comprises:
3 a main graft member coupled with the proximal stent member; and
4 two leg members, each leg member removably couplable with the main graft
5 member and coupled with one of the two iliac stent members.

1 37. A stent-graft device as in claim 33, wherein at least one of the
2 proximal stent member and the at least one distal stent member comprises:
3 at least one self-expanding stent member; and
4 at least one balloon expandable stent member coupled with the self-expanding
5 stent member.

1 38. A stent-graft device as in claim 33, further comprising a suprarenal
2 anchoring member coupled with the proximal stent member for anchoring the stent-graft
3 device at a location superior to at least one renal artery branching from the aorta.

1 39. A stent-graft device as in claim 38, wherein the suprarenal anchoring
2 member comprises at least one of a self-expanding member and a balloon expandable
3 member.

1 40. A stent-graft device as in claim 33, further comprising at least one skirt
2 member coupled with the proximal stent member and extending distally.

1 41. A kit for treating an abdominal aortic aneurysm, the kit comprising:
2 at least one stent-graft device for treating the aneurysm;
3 at least one stent-graft positioning device positioning the at least one stent-
4 graft device in the abdominal aorta to treat the aneurysm; and
5 instructions for using the stent-graft device and the positioning device.

1 42. A method for treating an abdominal aortic aneurysm, the method
2 comprising:
3 positioning at least one stent-graft device in the abdominal aorta in a location
4 for treating the aneurysm, the at least one stent-graft device having at least one self-
5 expanding member and at least one balloon-expandable member coupled to the self-
6 expanding member; and
7 deploying the at least one stent-graft device to contact a portion of the
8 abdominal aorta with at least a portion of the device.

1 43. A method as in claim 42, wherein positioning the at least one stent-
2 graft device comprises positioning a proximal stent member at a location within the aorta
3 inferior renal arteries which branch from the aorta and superior to the aneurysm.

1 44. A method as in claim 43, wherein positioning the at least one stent-
2 graft device further comprises positioning at least one distal stent member at a location within
3 at least one iliac artery of a patient.

1 45. A method as in claim 44, wherein positioning the at least one stent-
2 graft device further comprises positioning at least one suprarenal anchoring member coupled
3 with the at least one proximal stent member at a location within the aorta superior to the renal
4 arteries.

1 46. A method as in claim 44, wherein positioning the at least one stent-
2 graft device comprises positioning the device over at least one of a guidewire and a guide
3 catheter.

1 47. A method as in claim 46, wherein positioning the device comprises
2 positioning at least one helical leg portion of the device over at least one of the guidewire and
3 the guide catheter.

1 48. A method as in claim 42, wherein deploying the at least one stent
2 member comprises:
3 releasing the stent member from a containment member to allow the at least
4 one self-expanding member to expand; and
5 expanding the at least one balloon-expandable member with an expandable
6 balloon device.

1 49. A method as in claim 42, further comprising:
2 positioning a suprarenal anchoring member coupled with the stent-graft at a
3 location within an aorta superior the renal arteries; and
4 releasing the suprarenal anchoring member from a containment member to
5 allow the suprarenal anchoring member to expand and contact the wall of the aorta.

1 50. A method as in claim 42, further comprising adjusting the stent-graft
2 member by expanding the at least one balloon-expandable member with a balloon expansion
3 device.

1 51. A method as in claim 42, further comprising positioning a tubular graft
2 member coupled with at least one of the self-expanding member and the balloon expandable
3 member across at least part of the aneurysm.

1 52. A method as in claim 42, further comprising expanding a balloon
2 member within at least part of the aneurysm.

1 53. A method as in claim 42, further comprising positioning a skirt member
2 coupled with the stent-graft device within at least a portion of aneurysm.

1 54. A method as in claim 42, wherein the at least stent-graft device
2 comprises a plurality of coupled members, each of the coupled members comprising either a
3 balloon-expandable material or a self-expanding material.